

HI-FOG® case study

City service tunnel, Helsinki, Finland



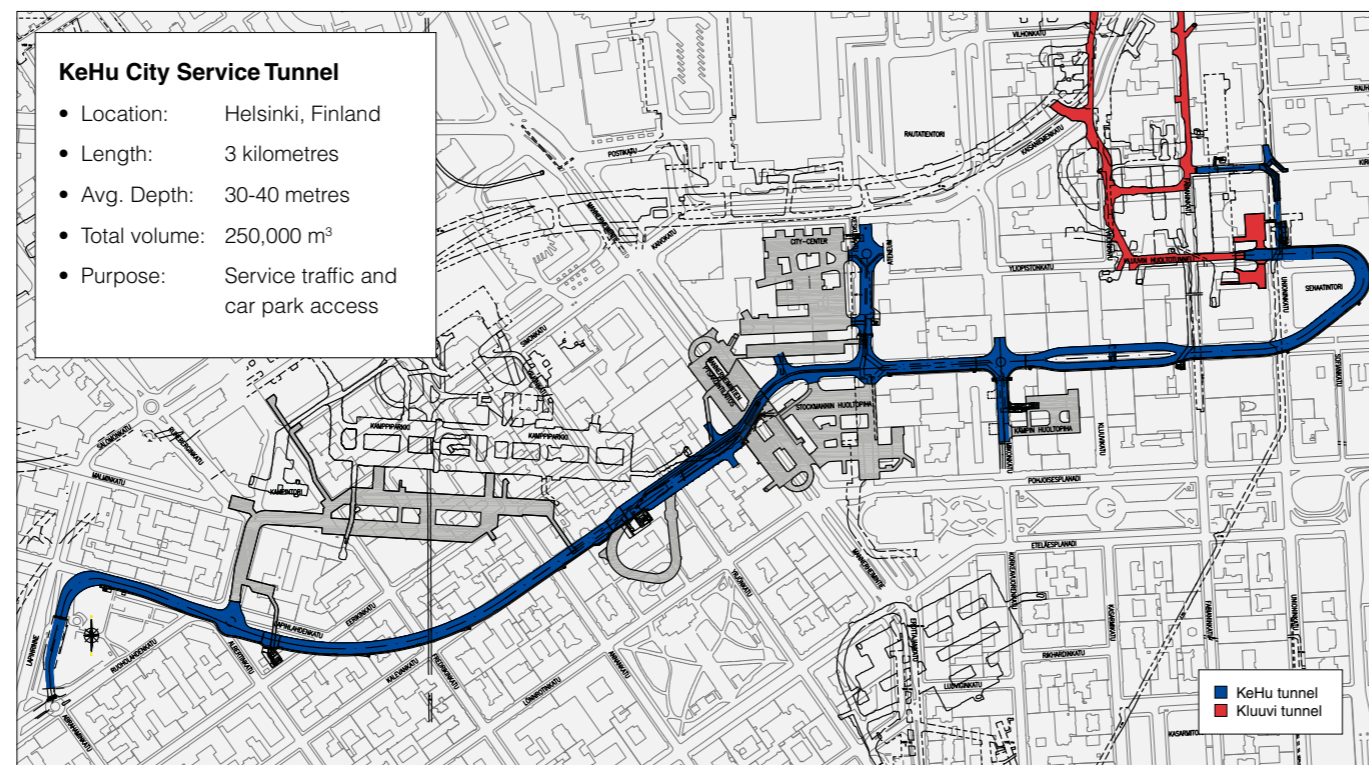
MARIGFF

A UTC Fire & Security Company

Ensuring safety and business continuity under Helsinki

There's been a rumbling underground, a sign of big changes for Helsinki. The new city service tunnel "KeHu" is reshaping the subterranean landscape of the Finnish capital. This massive new tunnel will be the main thoroughfare for delivery vehicles carrying supplies to stores and shops downtown.

Improving downtown traffic flow and air quality has been the main driver for building the tunnel. It also opens up additional new retail space from old parking and service areas, along with new access to underground car parks. Both customers and retailers will reap benefits from the new underground space. Providing fire protection for this crucial service artery will be the job of HI-FOG®.



The HI-FOG® protected new city service tunnel network runs east to west under downtown Helsinki.



A rarity in tunnels, HI-FOG® protects all four KeHu roundabouts

Tunnel safety

Underground, the main danger from fire is heat build up. The tunnel space effectively becomes an oven as the heat has nowhere to escape. In addition, smoke can be a severe problem as it can rapidly fill escape passages. For the KeHu tunnel, there was also the risk of smoke spreading above ground because of the access points to stores.

"If there is a fire down there, there is not much a fire brigade can do," says Juha-Pekka Laaksonen.

"One of the most important requirements was active fire protection. If there is a fire down there, there is not much a fire brigade can do," says Juha-Pekka Laaksonen, chief fire engineer at L2 Fire Safety Ltd., who provided consulting for the KeHu project.

Choosing HI-FOG®

"Zone-based fire suppression was an absolute must," remarks Jouni Maidell, KeHu project manager from the Helsinki City Public Works Department. "Consider the possibility of two trucks colliding. That adds up to a potential fire risk 25 meters long. In such as case, that whole area needs to be activated. In addition, we needed to have the adjacent

regions activated. So the entire fire area could actually be 50 meters long."

"The reliability of the fire protection system was very important," notes Laaksonen. "We also looked at how the system would affect other aspects of the project," adds Maidell.

Two options were considered for protecting the tunnel: conventional sprinkler systems and HI-FOG®. In the public tender, HI-FOG® came in with the lowest price tag. The very low water consumption of HI-FOG® combined with its excellent temperature control easily met the fire protection requirements and allowed savings in other systems such as drainage and water supply.

"With HI-FOG® we could be sure of reaching the desired level of safety at a reasonable cost," says Kalliomäki, project leader from the main designer Saanio & Riekkola.

Implementation

750,000 cubic meters of material was blasted to make room for the tunnel. "This is the most complex tunnel network ever built in Finland," says Kalliomäki. "It has two-way traffic, connections to several other infrastructure projects, even roundabouts." Marioff won the public tender in November 2007, and installation of the first phase was carried out between April 2008 and May 2009. The first phase saw installation of the diesel pump room and

HI-FOG® tubing for the first kilometre of new tunnel, including technical rooms and shafts.

The second phase began in February 2009 and ran till October 2009. HI-FOG® tubing was installed for the remaining 1.2 kilometres of new tunnel as well as for the fire-doors at store access points.

The Kluuvi extension

The final phase connected the new tunnel to the 25-year-old Kluuvi tunnel. The new HI-FOG® system was extended into the Kluuvi area so that the entire tunnel has the same level of protection. This led to significant savings as the same pump room could serve both new and old tunnels.



HI-FOG® offered a fast and cost efficient solution to replace the old ineffective sprinkler system in the Kluuvi tunnel.



HI-FOG® spray head for tunnels is available also with a protective cap

HI-FOG® system for KeHu

- **Pump:** 3 diesel pumps (2+1 backup), each with 1200 l/min flow rate
- **Nozzles:** Open spray head nozzles
- **Protected zones:** 125
- **Section valves:** Fireproof HI-FOG® tunnel section valve system SAE 2"
- **Water supply:** A-class water source: main city sprinkler feed and separate water reservoir located near pumps



Final system commissioning by Marioff engineers ensured reliability and proper interaction with other safety systems.

Setting new standards

“We planned from the beginning for this to be a model project to demonstrate what tunnel safety can be,” says Maidell. Several independent systems work together with HI-FOG® to protect the tunnel, such as security cameras that turn toward the fire, escape route highlighting, and notification systems for neighboring facilities.

There haven’t been any real fires, but there has been a false alarm. The temperature setting for the fire detection system was set too low in some places. This meant exhaust from a standing truck was enough to

activate the alarm. Nonetheless, the false alarm was a good practice run. “It proved HI-FOG® is working as it should,” says Maidell. “We are pleased with how things have gone. The flexibility of HI-FOG® has been great.”

“We planned from the beginning for this to be a model project to demonstrate what tunnel safety can be,” says Jouni Maidell.



Marioff’s turn-key solution included training for operators and the local fire brigade.



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